

CLAIMS

What is claimed is:

1. A horizontal stacker comprising:
 - an input feeder that receives items to be stacked in a first, generally horizontal orientation, and transitions the items to a generally vertical orientation at an off-loading position;
 - at least one stabilizing device located at the off-loading position which receives the items from the input feeder and stabilizes the items in the generally vertical orientation; and
 - an accumulator assembly, which receives the items from the stabilizing device and includes at least one holding ram that is connected to a drive that indexes the holding ram back as the generally vertically oriented items are stacked together horizontally against the holding ram to hold the items in the generally vertical orientation as they are stacked.
2. The horizontal stacker according to claim 1, wherein the input feeder includes at least one star wheel for receiving the items in the generally horizontal orientation and which are rotatable substantially 90 degrees to transition the items in the generally vertical orientation and deliver the items to the stabilizing device.
3. The horizontal stacker according to claim 2, wherein at least one actuator is positioned in proximity to the at least one star wheel for displacing the items from the star wheel onto the stabilizing device.
4. The horizontal stacker according to claim 2, wherein the at least one star wheel is a plurality of adjacent star wheels for receiving the items and simultaneously delivering the items to the stabilizing device in separate rows, and wherein the at least one holding ram is a plurality of holding rams for individually

receiving the separate rows of items and creating separate rows of stacks of items therewith.

5. The horizontal stacker according to claim 2, wherein the at least one star wheel includes two substantially identical and parallel plates for support of the items.

6. The horizontal stacker according to claim 2, further comprising a sensor located adjacent to the at least one star wheel for determining whether an item has been received on the at least one star wheel.

7. The horizontal stacker according to claim 1, wherein the stabilizing device includes at least a first conveyor for receiving the items and holding them in the generally vertical orientation while transporting them to the accumulator assembly.

8. The horizontal stacker according to claim 7, wherein the first conveyor includes a plurality of holding flights for receiving vertically oriented items from the feeder between adjacent ones of the plurality of flights.

9. The horizontal stacker according to claim 7, wherein the first conveyor includes first and second transmission elements which translate about substantially identically sized and shaped looped paths at substantially equal speeds within parallel planes, the paths being offset by a given distance within the respective planes, and wherein each of the holding flights is pivotably connected to the first and second transmission elements about first and second pivots respectively, whereby the holding flights maintain an unvarying rotational orientation throughout their translation about the looped paths.

10. The horizontal stacker according to claim 9, wherein the accumulator assembly includes a second conveyor substantially perpendicular to the first conveyor and the holding flights eject the items onto the second conveyor where they are stabilized by the holding ram.

11. The horizontal stacker according to claim 9, wherein each of the flights includes a cutout which receives a portion of an adjacent one of the flights when the paths of the first and second transmission elements overlap.

12. The horizontal stacker according to claim 1, wherein the stabilizing device includes:

at least one receiving platform positioned between the accumulator assembly and the input feeder which receives the items from the input feeder; and

at least one collating pusher indexably movable in a first direction away from the input feeder as the generally vertically oriented items are stacked together against the collating pusher on the receiving platform, and movable in a second direction away from the receiving platform for allowing passage of vertically oriented items through to the accumulator assembly off of the receiving platform and for allowing the items to stack against the holding ram.

13. The horizontal stacker according to claim 12, wherein the collating pusher is movable toward the input feeder to relocate a stack of the items off of the receiving platform.

14. The horizontal stacker according to claim 13, wherein the accumulator assembly includes a conveyor and wherein the collating pusher is movable toward the accumulator assembly in unison with the holding ram to relocate a stack of the items off of the receiving platform onto the conveyor.

15. The horizontal stacker according to claim 14, wherein the conveyor is positioned substantially perpendicular to a direction of motion of the items through the input feeder.

16. The horizontal stacker according to claim 1, wherein the at least one holding ram comprises a plurality of adjacent holding rams for stacking individual rows of the items received from the stabilizing device, and wherein the accumulator assembly further includes a conveyor for substantially simultaneously receiving the stacked rows of items.

17. The horizontal stacker according to claim 16, wherein the conveyor includes partitions for separating stacked groups of items between the partitions.

18. A method for horizontally stacking items comprising:
providing at least one row of horizontally oriented items located generally on a plane;

consecutively rotating the items substantially 90 degrees, whereby the items are vertically oriented, and horizontally stacking the items at an off-loading position on a receiving platform against a collating pusher;

indexing the pusher away from the stacked items to allow newly stacked ones of the stacked items to fit on the receiving platform;

withdrawing the pusher away from the stacked items when a first predetermined number of items are stacked on the receiving platform;

providing a conveyor adjacent to the receiving platform; and

receiving the stacked items with at least one holding ram and indexing the holding ram away from the stacked items to allow the newly stacked ones of the stacked items to fit on the receiving platform and allow the stacked items to be received onto the conveyor.

19. The method according to claim 18, wherein the step of providing at least one row includes providing a plurality of rows of items, and wherein the step of receiving the stacked items includes receiving a plurality of rows of stacked items with a plurality of holding rams of equal number to the number of rows, and further comprising the step of indexing the conveyor in a direction perpendicular to the rows a distance sufficient to allow new ones of the rows of stacked items to form on the conveyor when a second predetermined number of stacked items are present in each of the rows on the conveyor.

20. The method according to claim 18, further comprising inserting the collating pusher adjacent a most recently stacked one of the stacked items opposite the holding ram when a second predetermined number of items has been stacked whereby the stacked items are disposed between the holding ram and the collating pusher, and moving the collating pusher and holding ram in unison to sweep the stacked items onto the conveyor.